DATA EVALUATION RECORD

1. CHEMICAL: MGK 264

2. TEST MATERIAL: MGK 264 technical 92.9% active ingredient,

3. STUDY TYPE: 96-hour Freshwater Fish Flow-Through Acute Toxicity Test.

4. CITATION: Bowman, J.H. 1991. Acute Flow-Through Toxicity of MGK 264 to Rainbow Trout (Oncorhynchus mykiss). Study Performed by: Analytical Bio-Chemistry Laboratories, Inc., Columbia, MO. Submitted by: McLaughlin Gormerly King Company, Minneapolis, MN. MRID 419115-01

5. REVIEWED BY:

Greg Susanke, Biologist
Ecological Effects Branch
Environmental Fate and Effects Division (H7507 C)

6. APPROVED BY:

Les Touart, Supervisory Biologist
Ecological Effects Branch
Environmental Fate and Effects Division (H7507 C)

11-12-91

7. CONCLUSION:

This study appears scientifically sound and fulfills the Guideline requirements for an acute 96-hour toxicity test for a coldwater fish species (72-1 c). The LC50 of MGK 264 to rainbow trout is 1.4 mg/L, therefore it is considered moderately toxic. The NOEC is 0.41 mg/L.

8. MATERIALS AND METHODS:

A. Test Organisms:

Species- Rainbow trout (Oncorhynchus mykiss)

Supplier- Mt. Lassen Trout Farm, Red Bluff, CA

Mean weight- 2.38 ± 0.43 g

Mean length- 55 ± 3 mm

Acclimation period- Fish were hatched then reared. Forty-eight hours prior to test initiation fish were removed from the culture tank and placed in the temperature acclimation unit. During this time food was withheld.

B. Test System:

Source of dilution water- soft blended water

Water temperature- 13 °C

pH- 7.9

Dissolved oxygen- 8.4 mg/L

Total hardness- 44-46 mg/L as $CaCo_3$

Total Alkalinity- 54-56 mg/L as $CaCo_3$

Specific conductance- 100-110 umhos/cm

Total organic carbon- <1 mg/L

Test aquaria- 30 L glass aquaria

Type of dilution system- Proportional diluter system was calibrated to provide 50% dilutions between each treatment level

Flow rate- 6.7 aquarium volume additions per day

Biomass loading rate- 0.24 g/L per day

Photoperiod- 16 hours light, 8 hours dark

C. Test Design:

Range finding test- In a 96-hour static test there was 0 mortality at 1.0, but there was 100% mortality at 10.0 and 100.0 mg a.i./L.

Definitive test

Nominal concentrations- 0.25, 0.50, 1.0, 2.0, and 4.0 mg a.i./L

Controls- There was a water and solvent control (.1 ml dimethyl formamide)

Number of test organisms- 20 per aquaria, total of 140 fish (5 treatment levels, 1 control group)

Biological observations- Made at test initiation and subsequent 24 hr intervals.

Water parameter measurements- Water temperature, DO and pH were measured in both controls, the low, middle and high concentrations, at 0-, 48-, and 96 hours. Total alkalinity, total hardness and specific conductance taken at test initiation and test termination.

9. REPORTED RESULTS:

Mean measured concentrations- 0.2, 0.41, 0.83, 1.7, 4.1 mg a.i./L are 80-103% of nominal concentration, measured at 0 hour and 96 hours

Recovery of chemical- Average MGK 264 recovery was 105% of fortified spiked levels at 0- and 96 hours.

Mortality and observations- There was 100% mortality at 4.1 ppm within 24 hours. There was 80% mortality at 1.7 ppm after 96 hours. There were no mortalities in the other treatment groups and the controls. At 0.83 and 1.7 ppm sublethal effects were noted such as: surfacing, labored respiration dark discoloration, fish on bottom, quiescence, loss of equilibrium, erratic swimming and flared gills.

An oily surface film with clear, oily droplets was present on the mixing cell solution and in the 4.1 ppm solution. An oily surface film was also found in the 1.7 ppm solution.

10. STUDY AUTHORS'S CONCLUSIONS / QUALITY ASSURANCE MEASURES:

The 96-hour LC50 based on mean measured concentrations was 1.4 mg/L with 95% C.I. of 0.83 mg/L - 1.7 mg/L. The slope of the toxicity curve was 6.6. The NOEC was 0.41 mg/L.

Quality Assurance and Good Laboratory Practice Regulation Statements were included in the report, indicating that the study was conducted in accordance with the FIFRA Good Laboratory Practice Standards set forth in 40 CFR Part 160.

11. REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:

A. Test Procedure: The test procedures were generally in accordance with protocols recommended by the Guidelines.

B. Statistical Analysis:

The LC50 was calculated by the Ecological Effects Branch toxanol computer program which used the binomial method.

C. Discussion/Results:

The study results appear to be scientifically valid. The 96-hour LC50 value was determined to be 1.3 mg/L, based upon mean measured MGK 264 concentrations. The 95% confidence interval is 0.83 - 1.7 mg/L, and the NOEC is 0.41 mg/L. MGK 264 is classified as moderately toxic to coldwater fish.

D. Adequacy of the Study:

1. Classification: Core

2. Rationale: guidelines

Greg Susanke mgk 264 LC50 Rainbow Trout

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CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB.(PERCENT)
4.1	20	20	100	9.536742E-05
1.7	20	16	80	.5908966
.83	20	0	0	9.536742E-05
.41	20	0	0	9.536742E-05
.2	20	0	0	9.536742E-05

THE BINOMIAL TEST SHOWS THAT .83 AND 1.7 CAN BE
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 1.360335

WHEN THERE ARE LESS THAN TWO CONCENTRATIONS AT WHICH THE
PERCENT DEAD IS BETWEEN 0 AND 100, NEITHER THE MOVING AVERAGE
NOR THE PROBIT METHOD CAN GIVE ANY STATISTICALLY SOUND RESULTS.

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